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Ecology of a Certain Orchid.

BY EDWARD L. GREENE.

The plant I have in mind is *Cypripedium acaule*, distinctly a noteworthy member of its family, rather unique even in so showy and beautiful a genus, on account of two large basal leaves from the midst arises its naked stem, almost too slender to support strongly its one large purple odorous flower; and the plant, is withal, something of a rarity. In the vast prairie regions lying to the southward of Lake Michigan there must be a number of botanists of the younger generation, I think, who never saw this *Cypripedium* growing. I myself who, within the last forty years have botanized on foot some thousands of miles on the prairies and in the woodland belts that skirt them in Indiana, Illinois, southern Iowa and southern Minnesota, never yet met with it in these districts.

I can not imagine that even a child, having in him the making of a botanist, would forget in after years the place where he first found this fine plant, the stemless species of Lady's Slipper.*

My own first coming upon this *Cypripedium acaule* happened when I was a botanizing child of seven or eight years. It grew on a wooded and rather dry slope above the Ashway, or, as they now call it, the Ashaway River, very near the village of Ashaway, Rhode Island. It was to me a startling discovery; for, used to ransacking all pastures and bogs, groves, woods and stream banks during several seasons before this, I had supposed I knew already all the native plants of my native township of Hopkinton; and here was

* I write it in that way advisedly; for it is certain that these plants were originally so called not in allusion to slippers of ladies in general. The meaning was Slippers of Our Lady, that is, the Blessed Mother. Away back in mediaeval times the universal Latin name of the Old World type of this genus was *Calceolus Mariae*.

† August 16, 1909.—Pages 61 to 80.

finest of them all, never chanced upon before in all my boyish botanizings. In my simplicity and ignorance I wondered if any one else had seen this curious glorious flower that hid itself away far from any path, in the most obscure shade of the woodland bank. I took it, root and all, to my home a mile away, purposing to make enquiry whether any one else had ever seen the plant and had a name for it. Several of my elders recognized it, and one of them said its name was Adam and Eve. I seem to have had the sense not to commit it to my mother's flower garden, but chose for it a shaded and precipitous bank close by; the sweet birch bushes and Kalmias, with the partridge berry (*Mitchella repens*) forming almost a turf at the place. As I remember with perfect distinctness, my transfer of the plant was to an exceedingly different spot, ecologically considered, from that in which I had found it; for there I had observed no kalmia, no betula, no mitchella, but only oak and hickory trees and hazel bushes, everything deciduous; the soil light and loose, of leaf mould; whereas in the proposed new habitat, the ground was clayey, also a little sandy. My transferred specimen did not reappear at all next season. Its new environment seems to have been fatal to it. Nevertheless, allowed to choose for itself, I know of no orchid, and of few other woodland plants, any one of which adapts itself to greater diversities of climate, soil and ecologic consociation.

My second meeting with this same orchid was at a station about one thousand miles westward from Rhode Island, where the climate is much more severe, where also both the nature of the soil in which it grew, and the plant association, were about as different as imaginable considering that the parallel of latitude is approximately the same. This, my second locality, was in the midst of a larch swamp in southern Wisconsin. Here *Cypripedium acaule* would have to be classed as a bog plant; for a larch swamp in Wisconsin is a very wet place; usually almost wholly sphagnous. In some parts of it the only way of getting about without wading, or else sinking deeply into the watery-spongy masses of sphagnum was to step from one to another of the large superficial and horizontally spreading roots of the larches. Under the coarse network of these roots seemed to be nothing but water.

The sphagnous border encircling the central forests of tamaracks, or larches, yielded plentifully such interesting boreal shrubs as were then known by the names of *Cassandra calyculata*, *Andro-*

meda Polifolia, *Kalmia glauca* and *Pyrus arbutifolia*; then in patches of the more open sphagnum among these bushes grew such fascinating beauties as *Pogonia ophioglossoides*, *Calopogon pulchellus* and *Arethusa bulbosa*; while around and among them all were cranberry vines, and the little mats of several kinds of sundew. Not exactly among these sphagnophiles, but rather just under the shade of such larches as occupied ground a trifle more elevated, and where from the leaves of them and the viburnums and mountain ash bushes a slight depth of leaf mould had accumulated, one always found this fine cypripedium, also here and there along with it *Linnaea borealis*.

Now, as I have already said, the associations of this plant there in Wisconsin were in very marked contrast to those chosen by it in that part of New England where I had known it. And what may add still more to the interest of it in its tamarack marsh locality of the West, is this, that here, on wooded slopes like those where at the East one would have looked for this species, one met always with another cypripedium and not this. The southern boundary of the one Wisconsin marsh where I found *Cypripedium acaule* most plentiful was just such a rich shady hillside, sloping northward, of course; and this was the best station I knew of for *Cypripedium spectabile*; but no other grew there.

From the time of my observing *Cypripedium acaule* in the larch swamps of Wisconsin more than thirty consecutive years elapsed without my having once seen a living specimen of this fine orchid; years of sojourn and of travel in regions far beyond the range of it. I then came suddenly one spring day upon a large colony of it in a piece of low damp woods near the banks of the lower Potomac River in Maryland. I was fairly enthralled by the vision of so great a number of these beautiful things all in one place. I had been used to think it a piece of very good botanical fortune if ever I found three or four of them within a few feet of each other; and here there were some dozens of them to be seen at one view, and a considerable tract of this forest shade was in a manner covered with them; not, of course, that the plants were at all crowded together; they were scattered about, as usual, but the area occupied with them measured several rods, and there was such an almost total absence of larger undergrowth of shrubs and herbaceous plants as rendered many of the cypripediums visible at one glance.

During long years of ardent botanical field study I have been so well used to contemplate ecological conditions, that here,

almost from the first moment my delight in the absolute beauty of this scene, and the unexpected renewal of acquaintance with one of my childhood favorites, were mixed with a feeling of wonder at what to me seemed a new and strange kind of environment for this orchid. Naturally my ideal of a habitat for *Cypripedium acaule* was that of the frigid swamps of the far Northwest where hitherto my best acquaintance with the species had been made; a sphagnous swamp where mosses took the place of soil, and all the shade was that of a certain conifer. There, during nearly four months of every year the cypripedium roots were imbedded in ice; not in frozen earth, but practically in ice itself. Here in this low woodland of the mild South I doubt if ever in the middle of winter the ground freezes to the depth of an inch. The trees that make the shade are every one deciduous. They are nyssas, sweet gum, red maple, and hydrophilous oaks and ashes. No ericaceous undershrubs are near; there is no sphagnum, no moss or lichen, only a lycopodium or two; not a plant of arethusa or pogonia, though now and then one sees a little green-flowered achroanthus and an aplectnum, but no other orchids at all; and the leaf mould in which the plants flourish is more moist a great deal than that of the plants hillside habitat in New England. Indeed, not many rods away from where this fine colony grows the depression of the land falls to that of an open shallow pond that is occupied by no trees at all, but by boggy rhynchosporas and other sedges, and by sagittarias, saururus and peltandras, besides the lance-leaved subaquatic *Ranunculus obtusiusculus*. I have no other equally strong contrast ecologic in mind as that subsisting between the Wisconsin habitat for *Cypripedium acaule* and this of the lower Potomac in Maryland. It is one of the ecologic marvels of my own rather wide experience in North American botany.

Once again, and within a few years, also in a locality of the Potomac water shed, I met with this particular lady's slipper, and this time high up on the northward slope of the Blue Ridge. The elevation was little less than a thousand feet. The ground was not in the least degree marshy. It was a yellow bank of sandy-clayey formation. The associated plants were mainly low azaleas, vacciniums antennarias and hawkweeds; yet another and very striking contrast.

I have been informed by that excellent Canadian botanist, Mr. James M. Macoun, that not far from Ottawa *Cypripedium acaule*,

while most common in low ground bordering swamps, has for an alternative situation upland rocky woods in the shade of sugar maples.

It is a part of the common experience of field botanists that most plants of any rarity, or special interest are always to be sought each in some preferred soil and other points of environment, and there associated with almost always about the same list of concomitant species belonging to other alliances. Striking exceptions to this general rule may perhaps not be found so rare as we have been accustomed to think, especially when marked species like this which have a wide distribution, shall have been studied ecologically throughout the whole of their extensive range. But I doubt if any other North American plant will be found to occur under such extreme diversity of conditions as this one does, and that, as I suppose *Cypripedium acaule* does, without evincing any considerable diversity morphologically.

One botanical friend, much given to ecologic research, expressed a feeling of surprise at my account of this cypripedium, and wondered if the seeds, for example, of the high-northern bog plant would so much as germinate in the low sultry Potomac valley habitat.

The Name *Stemonitis* a Synonyme.

J. A. NIEUWLAND.

Taking as the fundamental rule for the nomenclature of plants that no names be accepted that antedate May, 2, of the year 1753, when the *Species Plantarum* of Linnaeus was edited, it must be shown that the name *Stemonitis* Gleditsch, 1753, was published later than the above date of Linnaeus' work, or the name as attributed to that author will not hold, assuming that date as the starting point for names of slime moulds. In some of the common texts* the genus is written *Stemonitis*, (Gleditsch) Rostafinski, 1873. The oldest name for the group of plants at present comprised under the genus is that of Micheli, † *Clathroidastrum*, given

* MacBride, T. *North American Slime-Moulds* (1899.)

Cook, M. C. *Myxomycetes of Great Britain*. (1877.)

† Adanson, M. *Familles des Plantes*, (1763) Vol. 11, p. 7.

in 1729. Adanson restored Micheli's name to the group in 1763, Linnaeus having either disregarded them or put them under another genus aggregate name. It is to be remembered that that *Clathroidastrum* as a name is objectionable from the Linnaean rules of nomenclature, but very little regard is had for the rules Linnaeus laid down, however reasonable they are. The name was formed from *Clathroides*, which in turn was patched up from *Clathrus*, the latter being the name of a genus of fungi. Linnaeus rightly suppressed all such names, but modern systematists not only accept them but have even created such. They are then hardly in a position to reject such a name as even *Clathroidastrum* for etymological reasons. As a matter of fact, the Linnaean rules of nomenclature are not only at present not followed, they are positively ignored. The name must be either *Stemonitis*, Gleditsch, 1753, or *Clathroidastrum*, Adanson, 1763, for those that go back no farther than Linnaeus for plant names, but *Stemonitis*, (Gled.) Rostafinski, 1873, is antedated. The name *Stemonitis*, as given by Ludwig Böhmer, in the Third edition of Ludwig's *Definitiones Plantarum* of 1760, is an impossible aggregate, containing the genera *Stemonitis* proper, *Comatricha*, *Buxbaumia*, one of the mosses, and *Clathrus*, *Sphaerocephalus*, *Eubolus*, several genera of fungi. Such a conglomeration of totally different plants under *Stemonitis*, cannot be accepted under that name by any reasonable scientific method of modern classification. If the month of the publication of Gleditsch's work is not given, as seems to be the case, then there still remains the doubt whether it was even as aggregate of both *Stemonitis* proper and *Comatricha*, published before May 9, of the year 1753, or whether after that date. Until this matter of doubt be cleared up we provisionally indicate that specific names of the genus now under *Stemonitis*, (Gleditsch) Rost. 1873, be referred to the older name, *Clathroidastrum*, Adanson, 1763. For those that do not take the year 1753 as the "starting point" for botanical nomenclature, the name *Clathroidastrum*, Micheli, 1729, seems to be the correct name, and as we shall try to show, is the oldest name for the genus under its modern limitations, i. e. separate from *Comatricha*.

As to the valid publication of the name by Adanson there can be as little doubt as for the publication of *Mucilago*, Adanson, now generally accepted without question. Though Adanson's descriptions are generally brief, and may be suspected of incompleteness,

his references in the cases in question to the more clear and lengthy description of Micheli taken together with the plate of the plant by the latter author, establishes beyond the doubt the identity of the *Clathrodastrum* of Adanson with that of Micheli. M. C. Cooke* apparently following the lead of Rostafinski, seems to infer that the genus *Clathrodastrum* of Micheli is an aggregate of *Stemonitis* proper and *Comatricha*, both names taken here in the sense commonly accepted.

Micheli quotes two species under *Clathrodastrum*:

- (1) *Clathrodastrum obscurum*, Majus, Tab. 94, Fig. 1.
- (2) *Clathrodastrum obscurum*, Minus, Tab. 94, Fig. 2.

The former is considered the type of the modern genus *Stemonitis* and has been called *Stemonitis fusca*, Roth, 1782, the latter has been generally considered to be the present *Comatricha typhina*, (Rost.) M. C. Cook or *Comatricha Stemonitis* (Scop.) Sheld. 1895, though on what grounds is not clear to me. May it not be possible that here as in so many cases in our modern nomenclature an error may have crept in which has been carefully copied by our mycologists no one ever challenging the names by careful examination of the original publication of Micheli?† That the first species of Micheli is a *Stemonitis* is generally admitted. May it not be possible that the second is also a *Stemonitis* taken in the modern sense? Examining the description‡ we find that Micheli states that the plates that illustrate his two species are shown in DD as drawn to their exact natural size, § i. e. to use his own words: "Vera autem plantae magnitudo ea est quae figura DD repraesentur." Applying an ordinary instrument or rule to the figures we find that one measures 14 millimeters and the second, supposed to be a *Comatricha*, is exactly 10 mm. high. Looking up the description of *Comatricha Stemonitis*, (Scop.) Sheldon, or as some call it *Comatricha typhoides* supposed to have been plant No. 2 of Micheli, we find that it never exceeds less than one-half that size, or to be specific, it ranges from 2-4 mm. Moreover no *Comatricha* of such size was known at that time or for many years later. The natural inference is that the second plant described by Micheli is not a *Comatricha* but a *Stemonitis* proper, which one is

* Cooke, M. C. *Myxomycetes of Great Britain* (1877) p. 46-47.

† Micheli, P. A. *Nova Plantarum Genera*, (1729) p. 214. Tab. 94.

‡ Do p. 215.

§ Do p. 215.

not for me to decide here. Following the description of Micheli which must be taken to mean what it says, the two species are certainly species of *Stemonitis* proper in the modern sense, and therefore *Clathrodastrum* is the oldest name for the group of plants hitherto put under *Stemonitis* proper and the latter name should be relegated to synonymy unless the name *Stemonitis*, Ludwig, 1760, be accepted. We give here the names in order of priority that would be affected by the acceptance of *Clathrodastrum* and unless the name be objected to on the grounds that it offends seriously against the Linnaean rules of nomenclature it has priority in its favor. We refrain from transferring the specific names for reasons laid down by Linnaeus in his *Philosophia Botanica*, regarding names in *oides* and *astrum*. Following is the list of American species affected.

Clathrodastrum, Micheli, 1729.

Clathrodastrum, Adanson, 1763.

Stemonitis, Gleditsch, 1753, in part.

Stemonitis, Ludwig, 1760, in part.

Stemonitis, (Gleditsch) Rostafinski, 1873.

(1) *Stemonitis fusca*, Roth.

(2) *Stemonitis confluens*, Cooke and Ellis, 1876.

(3) *Stemonitis nigrescens*, Rex, 1891.

(4) *Stemonitis maxima*, Schweinitz, 1834.

(5) *Stemonitis virginensis*, Rex, 1891.

(6) *Stemonitis Morgani*, Peck, 1889.

Stemonitis spendens, (Rostafinski), Lister, 1894.

(7) *Stemonitis fenestrata*, (Rex) MacBride, 1899.

(8) *Stemonitis Webberi*, Rex, 1891.

(9) *Stemonitis ferruginea*, Ehren. 1818.

Trichia axifera, Bull, 1791.

(10) *Stemonitis Smithii*, MacBride, 1893.

Stemonitis microspora, (Lister), Morgan, 1894.

(11) *Stemonitis carolinensis*, MacBride, 1893.

Stemonitis tenerrima, (B. and C.) Morgan, 1894.

(12) *Stemonitis pallida*, Wingate, 1897.

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Birds Found in St. Joseph Co. Ind., Each Day in May, 1909.

—
B. ALPHONSUS.
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The daily observations recorded in this article were made in the vicinity of Notre Dame and St. Mary's, Ind., the St. Joseph River near the latter and the lakes at the former making these places ecologically among the best in the county for finding a large variety of birds.

My object in keeping daily records of all the birds I see is to ascertain which species are widely distributed in each month of the year. I also have in mind to note, as accurately as a single person can, the dates of the arrival and departure of each species.

The reader will be enabled to see by looking at my daily lists of birds found during May which species are very common, fairly common, rare or very rare. Those recorded but a few times are generally migrants which were passing to the north or late from the south.

The Screech Owl and Nighthawk are seldom seen here at this time of the year. The Bittern, Alder Flycatcher, Loon and Yellow-legs are birds that nest in low land near the water. The writer had no opportunity of visiting such a locality. The Cardinal, Rose-breasted Grosbeak and Scarlet Tanager usually prefer quiet places in uninhabited woods for nesting.

It is interesting to note that certain species were not seen at all during the month. Such are the Hairy Woodpecker, Downy Woodpecker, Yellow-bellied Sapsucker, Chickadee, Ruby-throated Hummingbird, Bobwhite, Whip-poor-will and Loggerhead Shrike. Most of these birds nest in deep woods, none of which were visited by the writer. The Shrike is a quiet bird that nests in hedges. The Hummingbird did not arrive until June. The writer has never seen a Sapsucker in the spring after April.

These four species were seen every day during the month: Song Sparrow, Purple Grackle, Chipping Sparrow, Robin.

The following were seen on every date except those that follow their names:

The following species were seen on the dates after their names:

- | | |
|------------------------------------|-----------------------------------|
| Meadowlark 1, 11, 13, 26. | White-crowned Sparrow 2, 3, 4, |
| Field Sparrow 1, 2, 6, 8, 10, 12, | 6, 11 to 14, 23, 24. |
| 19, 26. | Yellow-legs 3. |
| Cowbird 8, 10, 13. | Myrtle Warbler 1 to 7, 11, 12, |
| Red-headed Woodpecker 1, 2, 3, | 14, 16, 18, 19, 28. |
| 6, 11, 15, 27, 30. | Yellow Palm Warbler 1, 2, 3, 5, |
| Flicker 2, 8, 11, 12, 14, 15, 18, | 9, 12, 14, 17, 18. |
| 19, 20, 21, 22, 23, 24, 30, 31. | Black-throated Blue Warbler 9, |
| Chimney Swift 1 to 6, 9. | 13, 19. |
| Kingbird 1 to 7, 9, 10, 13, 14, | Black-poll Warbler 17. |
| 24, 26, 27. | Bay-breasted Warbler 19. |
| Blue Jay 1, 3, 26. | Kentucky Warbler 1. |
| Crow 1, 2, 4, 5, 6, 8, 11, 14, 15, | Canadian Warbler 24. |
| 17, 19. | Wilson Warbler 28. |
| Orchard Oriole 1 to 6, 9, 10. | Hooded Warbler 13, 24. |
| Baltimore Oriole 1 to 4, 24. | Tennessee Warbler 24, 26. |
| Bluebird 3, 6, 7, 8, 10, 12, 13, | Wilson Thrush 3. |
| 14, 15, 20, 21, 24. | Least Flycatcher 22, 24. |
| Hermit Thrush 6, 8, 30, 31. | Sprigtail 29. |
| Spotted Sandpiper 3, 5, 13, 17, | Purple Finch 2, 4, 5. |
| 19, 21, 26. | Dickcissel 19, 23, 25, 31. |
| Goldfinch 1 to 11, 16, 18. | Yellow-throated Vireo 19, 23, 24, |
| Vesper Sparrow 1, 2, 3, 6, 7, 9, | 28, 29, 30, 31. |
| 10, 11, 12, 13, 14, 20. | Screech Owl 23, young bird. |
| Warbling Vireo 1 to 5, 7, 10, | Yellow-billed Cuckoo 28, 29, 31. |
| 11, 15. | Belted Kingfisher 2, 3, 4, 9, 23, |
| Catbird 1 to 6, 8, 9, 11, 27. | 24, 25, 30. |
| Brown Thrasher 19, 22, 24, 26. | Crested Flycatcher 27, 28. |
| House Wren 1, 2, 3, 6, 10, 11, | Phoebe, 1, 6, 11, 12, 19 to 24, |
| 13, 15, 18, 21, 26, 30. | 26, 28, 29. |
| Swamp Sparrow 5, 7, 19, 21, | Wood Pewee 18, 19, 20, 22 to 31. |
| 25, 28, 31. | Bobolink 13, 17, 23, 27. |
| Loon 4. | Red-winged Blackbird 3, 4, 7, |
| Ovenbird 11. | 12, 16, 17, 18, 28, 31. |
| Redstart 12, 13, 16 to 20, 28, 29, | Golden-crowned Kinglet 3, 4, |
| 31. | |

The following species were seen on the dates after their names:

Ruby-crowned Kinglet 1, 5, 9, 10, 14.	Rose-breasted Grosbeak 5, 9, 12.
Mourning Dove 2 to 5, 8, 12, 17, 19, 23, 24, 25, 27, 28, 30, 31.	Indigo Bird 5, 19, 21, 23, 24, 25, 27 to 30.
Nighthawk 27.	Barn Swallow 1, 2, 4, 6, 7, 17, 18, 19, 28.
Bittern 29.	Scarlet Tanager 19, 26, 28.
Purple Martin 13.	Cedarbird 27, 29.
Alder Flycatcher 25, 26.	Brown Creeper 3.
Kildeer 11, 15, 17, 18, 20, 28, 29, 31.	Yellow-Warbler 4, 5, 6, 9, 12, 13, 16 to 19, 22, 23, 27, 29.
Red-eyed Vireo 16, 19, 24, 26, to 30.	Blackburnian Warbler 13, 17.
Snowbird 1, 2, 4, 5, 28.	Maryland Yellow-throat 11, 19, 21, 25, 27, 28.
Towhee 2, 3, 4, 16, 19, 23, 25, 31.	White-breasted Nuthatch 5, 8, 12, 14, 21, 23, 24, 26, 28, 29.
Cardinal 19, 27.	

The following is the number of species seen each day of the month:

May 1, 18 species	May 17, 34 species
" 2, 21 "	" 18, 31 "
" 3, 26 "	" 19, 38 "
" 4, 27 "	" 20, 27 "
" 5, 29 "	" 21, 26 "
" 6, 18 "	" 22, 29 "
" 7, 23 "	" 23, 35 "
" 8, 20 "	" 24, 33 "
" 9, 26 "	" 25, 34 "
" 10, 17 "	" 26, 23 "
" 11, 25 "	" 27, 34 "
" 12, 29 "	" 28, 43 "
" 13, 25 "	" 29, 34 "
" 14, 22 "	" 30, 29 "
" 15, 21 "	" 31, 34 "
" 16, 29 "	

Total number of species seen during the month, 76.

Notes on Histological Technique.*

MOUNTING OF ALGAE.

J. A. NIEUWLAND.

In a personal communication from the well-known phycologist Professor G. S. West, of the University of Birmingham, England, I received an outline of a method of fixing, mounting, and preserving algae which, as he tells me, has not been given the attention that it perhaps deserves. The fluid used serves at the same time as a killing, fixing, preserving, and mounting medium, and for delicate structures like desmids and other algal forms, it is said not to be surpassed. It has the advantage, moreover, that it keeps the natural coloring of the green algae, something which the instructor in elementary laboratory work will appreciate better than anyone else. The fluid is a 2 per cent. solution of potassium acetate, just made blue with a small amount of copper acetate. The substance reduces plasmolysis of the cell contents to a minimum. The algae can be put into the solution and kept in it. If a permanent mount is wanted a small amount of the material is put on a rather thick slide and sealed with old gold-size several times after each drying. The mounts are permanent, but it is necessary to take great care in sealing, and to this end to use a thick slide. A thin slide will bend considerably in handling, and the sealing may be separated in this way from the slide, so that the preparation will dry up as the result.

For some reason the fluid presents considerable difficulty with *Vaucheria*, and plasmolysis is hard to avoid. I have found that the best way to treat *Vaucheria*, especially the zoospores before or just after germination, when the plant is particularly delicate, is to kill it rapidly with 3 or 4 per cent. formalin. The formalin must be completely and quickly removed or the preparation will turn black afterward. Fixing for half an hour in the 3 per cent. formalin will not be injurious. Remove the formalin by repeated washing with water. If the *Vaucheria* thus treated is rapidly brought into glycerin to which a little thymol is added, the preparation will be

* Reprinted from *The Botanical Gazette* 47:237-238, March, 1909.

as perfectly green as when alive, and will retain its green color indefinitely. The method may be extended to all small green forms like the smaller liverworts, fern prothallia, and moss protonemata.

To get the material into glycerin, add first a considerable quantity of 5 or 10 per cent. glycerin in water, and put the dish near but not on a radiator. In a few days the evaporation will leave the fluid thick. Once the preparation is in thick glycerin the color will not change, if the formalin has been completely removed.

The potassium-copper-acetate solution will not keep the natural color of diatoms. It has the property of removing the diatomin or yellow coloring matter from the diatoms and leaving the plants perfectly green. The solution can thus be used in demonstrating the presence of chlorophyll in these plants. The diatomin is removed or absorbed in a few minutes after application.

As I have found some difficulty in keeping the microscopic mounts made in the potassium-copper-acetate solution because of drying, I have evolved a modification of the glycerin method in combination with it. The mounts made by this method are perfectly durable, and when carefully prepared are superior to ordinary glycerin mounts, as all the green algae treated with it keep their natural colors indefinitely. Glycerin jelly can also be used at the end to make the mount even more durable than the ordinary glycerin mount would be. The procedure is as follows.

The algae to be used are fixed in the potassium-copper-acetate 2 per cent. solution. After they have been killed and fixed in this fluid (the time varying according to the specimen treated), add to the above solution an equal part of 10 per cent. glycerin solution and allow to concentrate by evaporation in a warm dry place protected from dust. The algae must be thoroughly separated from dirt and soil or the concentrated solution will precipitate a reddish-brown cloud of reduced copper. In nearly all cases the preparation when thickened will be covered with a film of acetates, which can be removed from the top of the fluid without injury to the material. The concentrated solution should be perfectly clear, of a light green color, and the chromatophores of the algae perfectly green as in life. I have often been asked by students, and in fact by those well acquainted with algae, whether the plants thus given them for examination were not really alive. The advantage of having plant material, especially for elementary students, in a condition as near as possible to the live state, obviates explanations about stains. I

have found it very undesirable to give beginners any material other than alive or such as looks like the live stage of the plant studied.

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Teratological Notes.

II. AN ABNORMAL FLOWER OF *CAMPANULA ROTUNDIFOLIA*.

A somewhat similar case of abnormal growth as was noted in the first number of the *Midland Naturalist* by Professor Kirsch in the case of *Taraxacum officinale*, Weber, was observed during the summer of 1906, in *Campanula rotundifolia*, L. This peculiar specimen of the Common Bluebell was found at Notre Dame, Ind., north of St. Joseph's Lake, on a dry sunny slope of a hill. The extraordinary shape and size of the terminal flower of the plant made it an object that caught immediate attention. The whole flowering axis of the plant was picked and is now preserved in four per cent. formalin.

The main stem and the peduncle of the plant from the root leaves to the abnormal flower at the tip, is flattened throughout and about one-fourth of an inch in width. Branching from this main axis appear at intervals a number of pedicels with normal flowers with five parts to their calyx and corolla. The apical abnormal flower is in general somewhat flattened. Its calyx is synsepalous and attached to the ovary the usual height as in ordinary flowers, but it has 32 teeth instead of the usual 5. The calyx-teeth are similar to those of an ordinary flower and all of equal size and perfectly formed, and 28 lobes of the corolla are present, these also of normal appearance. On account of the large number of the lobes of the sympetalous corolla, the flower has rather the appearance of a cow-bell, than an ordinary bell with the parts crimped and doubled in upon themselves in several places. The flower is perfectly full-blown and the anthers have in large part fallen away, adding to the difficulty of finding the exact number at present. The stamens must have been about 27-30. The style of the flower is flattened with the upper stigmatic part thickened, the

whole of about the height of the ordinary style. The plate-like style is about one-half an inch square and ridged upwards, all its edges being perfectly entire.

The ovary is of the same diameter as that of the normal flower, but is about three-quarters of an inch long, and contains about 30 cells in two rows horizontally on the torus. The ovules are to all appearances quite ordinary in general aspect.

During the spring of the same year another case of fasciation was found on the same hill in a specimen of *Claytonia virginica*, L. Three or four flowers seemed to have grown together into one, and only one such flower was found in the cluster.

III. ABNORMAL SPECIMENS OF DANDELION.

The following communication was received from Mr. E. W. Bowditch, of Boston, in reference to the article in the April number of the *Midland Naturalist*. With the permission of the writer the letter is here reproduced in full, as it may be of interest to our readers:

EDITOR MIDLAND NATURALIST,
Notre Dame, Indiana.

DEAR SIR:

My attention has been called to pages 24, 25 and 26 of the April number of the *Midland Naturalist* where is shown an abnormal specimen of the common dandelion (*Taraxacum officinale*) with a statement, etc., of its occurrence over a limited area of a highly fertilized lawn.

If Prof Kirsch could travel from Utica to Binghamton, N. Y., by rail, at the season when the dandelion is in blossom, he would probably see a sight he never would forget.

At Hamilton, N. Y., where the writer has noticed the abnormal growth more in detail than elsewhere, it may be stated that acres upon acres of ground show the same peculiarity—not always to the same extent as shown in the illustration in the *Midland Naturalist* but there would be no trouble in collecting literally bushels of the plant showing abnormal growth on the grounds of Colgate University alone. No specimens were found having more than ten heads united.

From the fact that in places between Hamilton and Utica the railroad banks (fill) will be seen almost a solid blaze of yellow—when the blossoms are in their prime, and from the fact that most of the University grounds have never been treated to a thorough manuring, or kept as lawns, it may be questioned whether the growth is due to extraordinary fertilization, or to natural causes—Hamilton is comparatively high in altitude, the brooks are all strongly impregnated with lime and through the meadows where the dandelions show the best, the soil which is quite stony, is several feet deep.

Between Hamilton and Binghamton, the show of color from the car windows is extraordinary, and though I am not familiar with much of the country except from car windows, the fact that the railroad fills, which are preferably not made with rich soil,* literally blaze with color, would incline me to believe some other reason than rich soil might be responsible for the phenomenon.

Yours very truly,

ERNEST W. BOWDITCH.

* Editor's Note. Since the publication of Prof. Kirsch's article we have found four or five cases of fasciation of dandelion. Usually not more than three or four heads were united, and the plants were in every instance found in very unfavorable conditions such as are indicated by Mr. Bowditch. One plant was found on gravelly soil on the edge of a cement sidewalk and the others coming up from an old cinder path. Another plant on the edge of a gravel walk had as many as eleven heads combined. It has been observed that very old clover plants are more apt to have more than the normal number of blades to the leaf. Such plants have been found to have more 4, 5 and 6-bladed leaves than 3-bladed ones. Might not age also have some influence on formation of abnormal growth?

Editorial Note.

"SPINELESS CACTI."

In the course of a conversation with a representative of one of the European governments we discussed the subject of the "spineless cactus." As scientific expert attached to a consulate the gentleman had been deputed by his government to investigate these spineless forms with the object of later securing such for the tropical colonies. Before, however, his report was sent in a purchase had been affected by the authorities at home. His report was not very favorable we were told, for the "spineless cacti" developed the unfortunate tendency of reverting to their primitive and ordinary spiny condition. In fact he came to the conclusion that at present the best way of easily and surely obtaining "spineless cacti" for fodder for cattle is to have a laborer go from plant to plant and burn off the spines with an ordinary oil-blast lamp.

In view of this it would seem that spineless forms of *Opuntia* are still far from immutable, and that very little reliance can be put on the glowing accounts of scientific discoveries as related in the

modern popular magazines. It may also be questioned whether in exact knowledge regarding "spineless cacti" we have advanced much farther than our ancestors of several hundred years ago.

It has happened many a time in the history of science that we discover or rather rediscover something that was known centuries ago, and in our happy ignorance of the past we give it out to the world as "brand new," while the world for a time blissfully accepts it as such. In things botanical particularly there may arise the belief that nothing worth while was known before the middle of the 18th century. Botanical congresses have over and over again legislated that no plant names used anterior to 1753 are valid. Not only ordinary botanists, that take their information second and third hand, but also those that pretend to rank in the first class, may be tempted to think accordingly that little or no scientific observation was made before the so-called "starting point" in nomenclature. Many there are too that still believe that Linnaeus was the sole author of the binomial nomenclature. Nor did Linnaeus even in the *Species Plantarum* use binary names solely as may be seen by looking into that work. Names of three words will be found even there in considerable number,—such as *Alisma Plantago-aquatica*. Binomial nomenclature is about as old as any nomenclature as it is the only reasonable one, and such names will be found by the hundred in such pre-Linnaean authors as Matthioli, John and Caspar Bauhin, Dodonaeus, and many others.

In regard to "spineless cacti" we find that they were known and recorded about as early as there is any mention of cacti whatever. If the spineless forms, the discovery of which we claim in glowing accounts, are not permanent, they are all nothing more or less than teratological conditions known and modestly recorded by the older herbalists several hundred years ago. The older botanists knew the plant by the name we still use, *Opuntia*, and also by several others such as *Ficus Indica*, the Indian Fig, *Tune* or *Tunas* and a number of other less commonly used names. We shall here append some quotations from such of the pre-Linnaean botanists easily available to us, though there may be others that may have referred to spineless forms of *Opuntia*. In order to establish beyond doubt that the plant referred to by the older herbalists is really the one we now hear so much of, we shall append at some length the description of John Parkinson, more for the sake of

identification than of proof. The other authors, mostly in Latin are equally lucid, but they will be referred to only briefly.

Parkinson* in his herbal refers to the plant in the following terms: "The Indian Figge tree, if you will call it a tree (because in our Country it is not so, although it groweth in the naturall hot Countries from a woody stemme or body into leaues) is a plant consisting only of leaues one springing out of another into many branches of leaues, all of them growing out of one leafe put into the ground halfe way, which taking roote all the rest rise out thereof, those below for the most part being larger than those above, yet all of them somewhat long, flat, and round pointed, of the thickness of a finger vsually, and smallest at the lower end, where they are joined or spring out of the other leaues having at their first breaking out a shew of small, red, or browne prickes, *a few very fine and small hard white and sharpe, almost insensible prickes*, being not so bigge as haire on the under side which will often sticke in their finger that handle them vnadvisedly, neither are they to be discerned vnless one look precisely for them: The leaues on the *underside having none of those other great prickes or marks at all*† being of a fresh pale greene colour: out of the uppermost leaues break forth certaine greene heads, very like unto leaues so that many are deceiued, thinking them to be leaues, vntill they marke them better and be better experienced in them: but that they growe round and not flat, and are broad at the toppe; for that out of the tops of euery of them shooteth out a pale yellow flower consisting of two rowes of leaues, each containing fve leaues apeece, laid open with certaine yellow threads tipt with red in the middle: this greene head untill the flower be past, is not halfe that bignes that it attaineth unto after, . . ." etc.

p. 433. "This Indian Figge tree groweth dispersedly in many places of America, generally called the West Indies: The greatest kind in the more remote and hot countries, as Mexico, Florida, Virginia, and in the Bermudas or Summer Islands: from whence wee haue often had it, the lesser in Virginia and those other countries that are near unto us: which better endureth with us. . . Our people in Virginia, and the Bermuda Island, where it groweth plentifully, because of the form of the fruit, which is

* John Parkinson. *Paradisi in Sole, Paradisus Terrestris*, 1629.

† Italics are the Editor's.

somewhat like a peare, and not being so familiar with the growing of Figs, sent it vnto vs by the name of the prickly Peare, from which name many have supposed it to be a Peare indeede but were therein deceived."

We infer from this that the plants of *Opuntia* that Parkinson knew had but *few of the fine small prickles*, though he does not mention that he had seen them without these.

Dodonaeus in 1583* and 1618† states that spineless cacti were found though rarely.

Rembertus Dodonaeus Cruydt Boeck, 1618, Tot Antwerpen inde Plantynsche Druckerije (Dutch, 5th Ed.) p. 1274. "Voorts zoo zijn deze bladden langworpich an breedt somtijts dicker dan eenen duym ende daertwt steeken veele witte dunne lange en scherpe doornkens *maer somtijts doch heel seldom en hebben sij geen doornkens met allen.*" Translated. "Moreover these leaves are long and broad and sometimes thicker than one's thumb. From these spring many long thin white thorns. Sometimes, however, but very seldom they have no thorns at all."

As to the name of the plant Dodonaeus says here also that the plant was mostly called Tune or Tunas,‡ and he gives a binary name for it Tunas Americanum. *Opuntia* is also given as a synonyme, but the *Opuntia* of Pliny certainly was not our American plant. The name was mistakenly applied from Pliny by the early herbalists, because he said that the plant rooted from the leaves. Pliny applied the name to the other unknown plant because it was found around Opuns a city in Greece near the ancient city of Phocis. The oldest valid name for our plant is then that of Dodonaeus Tune or Tunas Americanum for we may yet find what the *Opuntia* of Pliny really is, and the *Opuntia* applied to our cactaceous genus will then be a synonyme. The application of ancient plant names to newly discovered or segregated plants is objectionable as when last applied they are virtually synonyms. Linnaeus was one of the greatest offenders against this rule, and the practice is not yet obsolete.

Stirpium Historiae Pemptades sex, Antwerpiae, 1583, p. 802.

* Rembertus Dodonaeus, *Stirpium Historiae Pemptades Sex*. 1583.

† Rembertus Dodonaeus Cruydt Boeck volgens sijne Laetste Verbeeteringen. Dutch 5th Edition. 1618.

‡ Theophrasti Eresii de *Historia Plantarum libri decem*. Comment. Joannes Bodaeus A. Stapel. 1644.

R. Dodonaeus has the same in Latin: "Oblonga autem Ficus Indicae lataque; sunt folio pollice non raro crassiora, e quibus albae, tenues oblongae, acutaeque prominent spinae (*raro absque his provenit.*) The translation is in substance the same as above.

Stapelius in 1644, in his commentary on the works of Dioscorides says that '*in Belgium sometimes the plant is found without any spines.*'

p. 40. Oblonga autem ficus Indicae lataq.; sunt folia, pollice nonnunquam crassiora, e quibus candicantes tenues, oblongae, acutaeque prominent spinae (*Quandoque tamen in Belgica absque his provenit.*) in extremis etc." He also mentions the name Tune or Tunas, as the one commonly used by the natives. "Ab Indis Tune vel tunas vocatur. In insulis Peruanis et potiissimum Hispaniola sponte crescit."

John Bauhin in his *Historia Plantarum Universalis*, 1650, referring to the works of Matthioli says that the latter had mentioned spineless plants. Matthioli's reference however, I have not been able to find. Neither the 1st edition of his commentary 1554, nor the edition of 1559 make any mention of the fact.

J. Bauhin and J. H. Cherler, *Historia Plantarum Universalis*, 1650. p. 154.

"Opuntia, Vulgo Herbariorum."*

"Ipsa vero quoque in magnam evadit arborem, cui folia magna longitudine interdum plusquam pedali, latitudine sesquipadali, ex oblongo rotundata, pollicem crassa, infima etiam crassiora durioraque supremis foris membrana tecta plurimis tuberculis asperata, e quibus spinulae albae acutae, facile contrectanti adhaerentes, infixoque aculeo stationem nativam deferentes. [*Matth., etiam sine spinulis visa testatur*] succo intus turgentia colore herbaceo . . . etc."

It is evident then that spineless forms of *Opuntia* were known in the 16th century. It is also evident that strictly speaking the name *Opuntia* is applied to the cactaceous plant is a synonyme, Pliny's plant being an entirely different one. In fact in the work of Bartholomaeus Anglus, † printed in 1480, there is a commentary on the plant of Pliny though very little light is thrown by this writer on its identity, but that it is not a cactaceous plant is self evident, such not having been known before the discovery of America.

* John Bauhin and J. H. Cherler, *Historia Plantarum Universalis*. 1650.

† Bartholomaeus Anglus, *Deproprietatibus*. 1480.

